SURREBUTTAL TESTIMONY OF JIM GREVATT

ON BEHALF OF THE SOUTH CAROLINA COASTAL CONSERVATION LEAGUE, SOUTHERN ALLIANCE FOR CLEAN ENERGY, UPSTATE FOREVER, SIERRA CLUB, AND NATURAL RESOURCES DEFENSE COUNCIL

Q: PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.

A: My name is Jim Grevatt. I am a Managing Consultant at Energy Futures Group, located at 10298 Route 116, Hinesburg, VT 05461.

Q: ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A: The South Carolina Coastal Conservation League ("CCL"), Southern Alliance for Clean Energy ("SACE"), Upstate Forever, Sierra Club, and Natural Resources Defense Council ("NRDC").

Q: HAVE YOU PREVIOUSLY FILED TESTIMONY AS AN EXPERT WITNESS IN THIS REGULATORY PROCEEDING?

A: Yes, I provided direct testimony in this case on behalf of the parties named above.

Q: ARE YOU SPONSORING ANY EXHIBITS?

A: Yes, I am sponsoring nine exhibits, Exhibits JG-1 through JG-9.

Q: WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY IN THIS PROCEEDING?

A**:** The purpose of my testimony is to respond to the Rebuttal Testimony of Jim Herndon and Brian Bak on behalf of Duke Energy Carolinas, LLC, ("DEC") and Duke Energy Progress, LLC ("DEP") (collectively, the "Companies" or "Duke

Energy"). Specifically, I discuss the Companies' rebuttal testimony with regard to the following:

1. The role of the Utility Cost Test ("UCT") compared with the Total Resource Cost Test ("TRC") in the Market Potential Study ("MPS");
2. The Companies' assertion that the MPS presents "actual" savings;
3. The Companies' view that the effect of "market acceptance" on savings potential is only negative;
4. The Companies' assertion that potential Codes and Standards updates cause an inability to rely on savings for affected technologies;
5. The Companies' use of the term "persistence" with respect to its Behavioral Programs;
6. The Companies' statements regarding emerging technology;
7. The Companies' conclusion that the MPS included all but one of the measures I identified as missing from its analysis.

Q: COULD THE COMPANIES' LIMITED APPROACH TO ITS MPS RESULT IN A FAILURE TO ADEQUATELY CONSIDER CONSUMER AFFORDABILITY AND LEAST-COST SERVICE?

A: Yes. Disregarding a full analysis of economic potential using the UCT and the potential of future technology improvements and enhanced program implementation, as the Companies have done in their MPS, could cause the IRP to rely on greater supply-side investments than it would otherwise require, which could result in unnecessary costs for the Companies' customers.

Q: IN HIS REBUTTAL TESTIMONY THE COMPANIES' WITNESS BAK PROVIDES CITATIONS FROM SACE REPORTS WHICH DESCRIBE DUKE AS A REGIONAL LEADER IN ENERGY EFFICIENCY. DO YOU DISPUTE THESE REPORTS?

A: I do not dispute that Duke Energy's energy efficiency ("EE") achievements exceed other utilities in the region. However, this does not relieve the Companies of their statutory obligation to ensure that their IRPs represent the "most reasonable and prudent plan," including consideration of the "affordability and least-cost" criterion of S.C. Code Ann. § 58-37-40 (C)(2). I also disagree with Witness Bak's suggestion that "because DEC and DEP are recognized leaders in energy efficiency and demand side management programs, much of the low-hanging fruit has already been plucked by the Companies."[1] The Companies have achieved higher savings levels than other utilities in the region, and should be commended for doing so, but that does not mean they face a dearth of cost-effective savings opportunities as a result. To the contrary, Duke Energy's experience in delivering cost-effective programs means the Companies are well positioned for future success.

Q: DO YOU AGREE THAT SAVINGS GENERALLY ARE MORE DIFFICULT TO ACHIEVE BECAUSE OF DUKE ENERGY'S PRIOR INVESTMENT IN ENERGY EFFICIENCY?

A: The relative ease or difficulty of achieving savings varies by measure, market segment, and product availability. Energy efficiency providers have had similar worries over time and have largely managed to find new measures and approaches

[1] Bak Rebuttal at 9.

for finding savings. To extend Witness Bak's metaphor of low-hanging fruit, no fruit farmer who wants to stay in business will only pick the low-hanging fruit and leave the rest, even if it is more difficult to pick. The Companies have a responsibility to pick all of the fruit from the tree so long as it can cost-effectively do so.

Q: DO YOU AGREE WITH THE COMPANIES THAT "WHILE MARKET ACCEPTANCE MAY BE ASSOCIATED WITH LOWER MEASURE COSTS, IT ALSO CORRESPONDS WITH DECREASING EFFECTIVENESS AS A UTILITY ENERGY EFFICIENCY PROGRAM"?

A: No. In fact this statement by Witness Bak seems to contradict the MPS. Nexant describes the product diffusion theory upon which it based its adoption estimates, saying "when the product is introduced, there is a slow rate of adoption while customers become familiar with the product. When the market accepts a product, the adoption rate accelerates to relative stability in the middle of the product cycle. The end of the product cycle is characterized by a low adoption rate because fewer customers remain that have yet to adopt the product."[2]

I have found in my decades of program management experience that programs obtain significant savings from measures that are in the middle of the product cycle as described by Nexant. Indeed, this is exactly what the cycle of savings from screw-based LED light bulbs has been, and the Companies achieved very large savings from LED lighting during "the middle of the product cycle." Witness Bak's testimony omits this key information, instead focusing on the end of

[2] Nexant South Carolina Market Potential Study, p. 78 (emphasis added).

the product cycle when widespread adoption could lead to lower net savings due to increased free ridership, which occurs only after a years-long period during which programs obtain significant savings.

Q: CAN YOU PROVIDE AN EXAMPLE OF A PRODUCT WHERE INCREASED MARKET ACCEPTANCE WOULD LEAD TO INCREASED SAVINGS OPPORTUNITIES?

A: Yes, heat pump water heaters are one such product. As stated by a witness for the Companies' Indiana affiliate, "Heat Pump Water Heaters are a proven technology; however, they are only a fraction of the total market in terms of sales. It is anticipated that these heat pump water heaters will continue to gain market share with increased customer adoption, which should improve the UCT score by spreading the fixed program costs across a larger number of participants."[3]

Q: IN HIS REBUTTAL TESTIMONY WHAT DOES WITNESS HERNDON SAY WITH REGARD TO THE DOMINANCE OF SHORT-LIVED BEHAVIORAL SAVINGS IN THE MPS' ACHIEVABLE POTENTIAL ESTIMATE?

A: Witness Herndon states that I "conflat[e] the Companies' use of a one year measure life for the purpose of cost effectiveness testing to the program's savings persistence. While the behavioral measures do require annual program expenditures to reinforce the behavioral messaging, with continued program intervention, they show persistent savings over a number of years."[4] Unfortunately, Witness

[3] Ind. Util. Regulatory Comm'n, Cause No. 43955 DSM 8, *Direct Testimony of Duke Energy Indiana Witness Amy B. Dean*, p. 10, available at https://iurc.portal.in.gov/docketed-case-details/?id=fa2ff172-5b05-ea11-a991-001dd800d878.

[4] Herndon Rebuttal at 10.

Herndon's description contradicts widely understood use of the terms in the industry and raises serious concerns for the Commission.

Q: WHY DO YOU SAY THE COMMISSION SHOULD BE CONCERNED?

A: First, Witness Herndon suggests that while a one year measure life is used for testing cost-effectiveness, the savings actually persist for more than a year. Standard industry practice requires that the measure life used for cost-effectiveness testing must be the best estimate of actual measure life, otherwise the cost-effectiveness test is invalid. Witness Herndon's attempt to suggest that the behavior savings persist for more than the one year measure life is also directly contradicted by the My Home Energy Report Program Evaluation (also conducted by Nexant). Table B-1:DSMore Measure Impact Results shows that the evaluated results are based on a one-year measure life, not on persistence that exceeds one year.[5] Thus, by stating that the savings persist for more than one year, Witness Herndon appears to be stating that he has not followed industry standard practice in testing the cost-effectiveness of behavioral savings.

Second, to suggest that behavioral savings "persist" with the caveat that they "do require annual program expenditures" is akin to saying that a refrigerator will persist in being able to keep your milk cold as long as you buy a new one every year. There is nothing in industry standard practice to support this approach to energy efficiency measures—and the Companies indicated in response to discovery that "no other EE measures included in the MPS have the same structure of repeated messaging or program investment that reinforces savings by the same participant

[5] N.C. Utils. Comm'n, Docket No. E-7, Sub 1230, Evans Exhibit B p. 118, available at https://starw1.ncuc.net/NCUC/ViewFile.aspx?Id=88c18987-ac17-4c7d-b52c-606835ef3710.

group over multiple years."[6] It appears that the Companies want to have their cake and eat it too, by claiming a one year measure life for cost-effectiveness testing and arguing that the savings are persistent, but they cannot have it both ways.

Q: WHAT DOES WITNESS HERNDON SAY ABOUT LONGER-LIVED EQUIPMENT MEASURES?

A: Witness Herndon says that "the equipment-based measures that Mr. Grevatt appears to prefer can suffer from free-ridership because their designs make it challenging to establish such a causal relationship between implementation of the measure and energy savings."[7] While this vague statement is not necessarily factually false – because some equipment measures in a portfolio may experience a small amount of free-ridership – Witness Herndon misleadingly suggests it would be risky for the Companies to promote longer-lived equipment measures that can both provide reliable, long term savings for customers and the reliable load reductions that the Companies require.

Q: DO OTHER UTILITIES PROMOTE EQUIPMENT BASED MEASURES IN THEIR ENERGY EFFICIENCY PROGRAMS?

A: Certainly, as do the Companies. And, despite Witness Herndon's suggestion that it is "challenging to establish such a causal relationship between implementation of the measure and energy savings," when asked in discovery whether Nexant's experience includes "developing net-to-gross estimates based on the causal relationship between program activities and measure adoption," Witness Herndon replied, "Yes, Nexant has extensive experience in DSM process evaluations,

[6] DEC-DEP Response to SELC Data Request 9-6.c, attached as **Exhibit JG-1.**
[7] Herndon Rebuttal at 11.

including developing net-to-gross estimates."[8] This statement shows that Nexant has found that developing net-to-gross estimates is not only possible, but a viable business opportunity.

Q: WHAT DOES WITNESS BAK SAY ABOUT CODES AND STANDARDS?

A: Witness Bak states that I overlook "another significant challenge…[in] stricter codes and standards, which narrow the incremental savings the Companies can achieve. As one example, if the new federal administration tightens the efficiency standards for heat pumps, a new baseline will be established for that technology. Thus, the Companies' opportunity for cost-effectively increasing customer savings beyond that new higher baseline efficiency standard will be reduced or eliminated altogether."[9]

Q: DO YOU AGREE WITH WITNESS BAK'S STATEMENT REGARDING THE IMPACT OF TIGHTENING CODES AND STANDARDS?

A: Witness Bak's statement inaccurately implies that because there may be a future standards "tightening" it therefore follows that the Companies will not be able to achieve savings. During each of the eight or nine year periods between the standards increases that Witness Bak referred to, the Companies claimed efficiency savings for the affected measures as confirmed by Witness Herndon.[10]

Q: DO YOU AGREE WITH WITNESS HERNDON THAT "USE OF THE UCT FOR UTILITY PROGRAM PLANNING WAS NOT EVEN PROPOSED BY THE COMPANIES UNTIL JUNE 2020"?[11]

[8] DEC-DEP Response to SELC Data Request 9-7, attached as **Exhibit JG-2**.
[9] Bak Rebuttal at 10.
[10] DEC-DEP Response to SELC Data Request 9-5, attached as **Exhibit JG-3**.
[11] Herndon Rebuttal at 13.

A: At the November 2019 Duke Energy Collaborative meeting, participants did discuss the use of UCT in the MPS with Witness Herndon and the Companies when the Scope of Work for the MPS was still in development. In fact, I suggested that the Companies present both UCT and TRC results without indicating in the MPS that one have more weight than the other. From my understanding, the Companies did not fully report UCT screening results because doing so would exceed the study budget. In other words, the Companies appear to have ruled out reporting UCT results before the MPS was started, without considering my recommendation.

Q: WHAT DOES WITNESS HERNDON'S REBUTTAL TESTIMONY SAY REGARDING THE USE OF THE UCT AND TRC IN THE MPS?

A: Witness Herndon states that "it is important to understand the perspective that each test provides," and goes on to provide that "[c]ustomers may not explicitly consider the TRC test in making decisions, but this test perspective does include the incremental costs that customers would incur to purchase and install an EE technology, while the UCT does not include any insight into customer expenses."[12] While I agree that a clear understanding is important, his second statement confuses the perspective that each test provides rather than clarifying it.

Q: WHY DO YOU SAY THAT MR. HERNDON CONFUSES THE ISSUE?

A: Witness Herndon implies that the TRC somehow provides better "insight" into customer expenses than the UCT, which is inaccurate. While the TRC does include both customer and utility costs, it makes no distinction between them. The TRC looks at <u>total</u> costs without regard for whose pocket they are coming out of; thus

[12] Herndon Rebuttal at 13.

the TRC result of an EE measure will effectively be the same regardless of whether the customer pays 100% of the cost or only 5% with 95% of the cost provided as a program incentive. Clearly though, a customer will look at that measure differently if they are paying the full cost.

There is a specific cost-effectiveness test that by design represents the customer's perspective. As confirmed by Witness Herndon, "[a]s described in the California Standard Practice Manual, the Participants Test is the measure of the quantifiable benefits and costs incurred by the [the] [sic] customer due specifically to participation in a program."[13] I agree with this statement. The TRC, however, does not reflect the customer's perspective and provides no value in assessing customer likelihood to adopt measures.

Q: DOES WITNESS HERNDON'S DISCUSSION OF THE UCT VS. THE TRC SUPPORT THE COMPANIES' DECISION TO USE THE TRC AS THE DISPOSITIVE TEST IN ITS MPS?

A: Not at all. In fact, Witness Herndon states the UCT "provides the perspective of the utility" and acknowledges that it "may be the most appropriate test perspective for utility program planning and design."[14] This is the case because a UCT result greater than 1.0 indicates the EE resource would require a lower utility expenditure of ratepayer dollars than the alternative investments it is being compared with. Because the IRP is conducted solely for the purpose of utility planning, the MPS should have relied on the UCT to determine economic potential rather than the TRC. Moreover, the UCT is now the cost-effectiveness test approved by this

[13] DEC-DEP Response to SELC Data Request 9-8, attached as **Exhibit JG-4**.
[14] Herndon Rebuttal at 13.

Commission as the primary cost-effectiveness screening test for the Companies,[15] a likelihood that was discussed in the Collaborative in 2019.

Q: IF THE UCT ONLY PROVIDES THE UTILITY PERSPECTIVE WOULD ITS USE MAKE A DIFFERENCE IN DETERMINING POTENTIAL CUSTOMER PARTICIPATION IN EE PROGRAMS?

A: As I explained in my direct testimony, Nexant indicated that the UCT resulted in a larger economic potential for demand side management ("DSM") and EE. In fact, Nexant reported that "the [UCT] results…indicate an increase of economic potential by 74%, 49%, and 11% for the residential, commercial, and industrial sectors in DEC. The results indicate an increase of economic potential by 24%, 54%, and 2% for the residential, commercial, and industrial sectors in DEP."[16] It is only reasonable to think that if more savings are economically viable, the opportunity for the Companies to promote their adoption is also greater.

Q: WHAT DO YOU MAKE OF WITNESS HERNDON'S STATEMENT THAT "WHILE THE UCT SENSITIVITY RESULTED IN HIGHER ECONOMIC POTENTIAL…IT IS NOT DIRECTLY TRANSFERABLE TO ACHIEVABLE POTENTIAL, WHERE THE CUSTOMER PERSPECTIVE MUST BE CONSIDERED"?[17]

A: Witness Herndon's statement is not inaccurate, but it misses the point. By definition, implementation of measures that pass the UCT leads to lower utility

[15] SC Pub. Serv. Comm'n, Docket. No. 2013-198-E, *Application of Duke Energy Carolinas, LLC for Approval of New Cost Recovery Mechanism and Portfolio of Demand-Side Management and Energy Efficiency Programs,* Order No.2021-32; Docket. No. 2015-163-E, *Application of Duke Energy Progress, LLC for Approval of New Cost Recovery Mechanism and Portfolio of Demand-Side Management and Energy Efficiency Programs,* Order No. 2031-33.
[16] Nexant South Carolina Market Potential Study, p. 72.
[17] Herndon Rebuttal at 13.

system costs; this is exactly what it means to say that these measures are cost-effective. So, while I agree that the UCT results may not be *directly* transferable to achievable potential, that does not mean the Companies should not evaluate the full economic potential in the first instance, and then aggressively pursue that potential. In fact, its statutory obligation to meet the "affordability and least-cost" criterion of S.C. Code Ann. § 58-37-40 (C)(2) requires it to pursue all cost-effective DSM and EE, because doing so results in lower system costs for ratepayers.

Q: BASED ON WITNESS HERNDON'S STATEMENTS DESCRIBED ABOVE, IS IT YOUR UNDERSTANDING THAT NEXANT SOMEHOW BASED ITS DETERMINATION OF ACHIEVABLE POTENTIAL ON TRC RESULTS?

A: While Witness Herndon's testimony seems to imply such a conclusion, it would contradict Nexant's statement in the MPS, that "projections of future participation and the ultimate maximum market saturation are determined by the historic rate of program participation and the imposed functional form of market adoption under theories of product diffusion."[18] In other words, TRC cost-effectiveness played no part in Nexant's determination of how much of the economic potential would be achievable. This makes sense because cost-effectiveness was already determined in the estimation of economic potential. None of Mr. Herndon's statements with respect to the TRC explain that it is a more appropriate test for Duke Energy to have used in determining economic or achievable potential.

[18] Nexant South Carolina Market Potential Study, p. 78.

Q: DO YOU AGREE WITH THE COMPANIES' WITNESS BAK THAT THE MPS "MUST REFLECT ACTUAL ENERGY AND DEMAND REDUCTION POTENTIAL"?[19]

A: Unfortunately, the meaning of Witness Bak's use of the term "actual" is not clear to me. Specifically, I find the idea of an "actual potential" to be a contradiction, somehow implying that there is a correct, verifiable answer for what the potential is. Merriam Webster defines "potential" as "existing in possibility" and "actual" as "existing in fact or reality."[20] I believe these definitions mean that something can either be actual, or an expression of potential—but not both.

Q: WHY DOES THIS MATTER?

A: Witness Bak uses this false notion of an "actual potential" to dismiss anything that does not meet his standard for "systematic, evidence-based analysis of the known and quantifiable energy and demand savings actually achievable by DEC and DEP."[21] While such an approach may provide Witness Bak with confidence that the Companies can meet its predictions, it provides absolutely no assurance that the Companies will not forsake opportunities to cost-effectively obtain greater levels of energy efficiency that could be achieved. The Companies seem willing to take this risk on behalf of their customers, preferring to rely only on what they know they can achieve.

[19] Bak Rebuttal at 3.
[20] *Compare* Merriam Webster Online Dictionary, "Potential", https://www.merriam-webster.com/dictionary/potential *with* Merriam Webster Online Dictionary, "Actual", https://www.merriam-webster.com/dictionary/actual.
[21] Bak Rebuttal at 3.

Q: CAN YOU PROVIDE AN ANALOGY TO CLARIFY THE POINT YOU ARE MAKING?

A: Consider if the Companies were tasked with determining the speed at which an individual could run a mile. They might look at that individual's speeds over the last several years as one data point, which would be analogous to benchmarking to past program performance. They might also look at the terrain of the course, and the shoes the individual typically wears, representing the known market conditions and available technology. And perhaps they would consider the individual's age or other factors, and then based on that information it might provide an estimate of achievable potential—say a ten-minute mile—and claim that because the analysis was based on known data, it is the "actual potential." However, there is nothing in that analysis to account for the potential of an improved training regimen, better diet, improved shoe technology, and so on. There is no proof in this type of analysis that the individual cannot run faster. Rather, it merely confirms data that are known without really considering "potential" at all. In other words, it provides a safe, "floor-level" estimate of achievable savings without considering potential at all.

Q: WHAT EVIDENCE CAN YOU PROVIDE TO SHOW THAT IN PRACTICE, UTILITIES CAN ACHIEVE GREATER LEVELS OF SAVINGS THAN PREDICTED IN POTENTIAL STUDIES?

A: The Public Service Company of Colorado ("PSCo") commissioned a potential study in 2016 which found that "cumulative electric achievable potential, which accounts for the rate of DSM acquisition, grows to nearly 8 percent of forecast

electric sales in 2028, or 0.8 percent per year on average over the 11-year study horizon."[22] Yet the Colorado Public Utilities Commission stated that it was:

> "…persuaded by the testimony offered by [the Colorado Energy Office, NRDC/Sierra Club, and the Southwest Energy Efficiency Project ("SWEEP")] as well as the analysis of the Company's DSM potential submitted by SWEEP that the energy savings goals for Public Service should be set at 500 GWh for each year for the period 2019 through 2023. While Public Service has historically argued for lower energy savings goals based on a 'changing marketplace,' we conclude that the Company's achieved annual DSM savings demonstrate a remarkably stable market for cost-effective electric DSM."[23]

In other words, the Colorado Commission found that PSCo could reasonably be expected to achieve far more than the potential study suggested would be possible, and in fact it required it to do so. That decision has now been validated by the evidence: to date, PSCo is achieving levels of savings that continue to exceed what its potential study indicated would be achievable, as illustrated below in Table 1:

[22] Colo. Pub. Utils. Comm'n, Proceeding No. 17A-0462EG, *Direct Testimony and Attachments of Shawn M. White*, Hearing Exhibit 102, Attachment SMW-2 at p. 11 (**Exhibit JG-5** at Page 93 of 250). The Direct Testimony of Shawn White and Attachment SMW-2 are attached to this testimony as **Exhibit JG-5.**

[23] Colo. Pub. Utils. Comm'n, Proceeding No. 17A-0462EG, Decision No. C18-0417 at 21-22, attached as **Exhibit JG-6**.

Table 1: PSCo Achievable, Ordered, and Reported Savings[24]

Year	Reference Case Acheivable Potential	Alternative Lighting Scenario Achievable Potential	PSCo Proposed Savings	Commission Ordered Annual savings	Reported Annual Savings
2019	410	348	350	500	504
2020	405	395	350	500	466
2021	336	329	325	500	N/A
2022	308	302	325	500	N/A
2023	272	267	325	500	N/A

Q: CAN YOU PROVIDE AN EXAMPLE OF A JURISDICTION IN ADDITION TO COLORADO WHERE THE REGULATOR ESTABLISHED SAVINGS TARGETS THAT WERE NOT BASED ON POTENTIAL STUDY FINDINGS?

A: Yes. In 2015, the Maryland Public Service Commission established a requirement that the EmPOWER utilities achieve annual savings equal to 2% of sales. In establishing this requirement, the Commission stated:

> [W]e find…that the continued lack of completion of the potential study can no longer be a barrier to establishing targets for EmPOWER. A potential study – the results of which are highly dependent on the selected input assumptions – is only one of several tools that can be used

[24] Data on PSCo achievable and proposed savings derived from Colo. Pub. Utils. Comm'n, Proceeding No. 17A-0462EG, *Direct Testimony and Exhibits of Shawn M. White*, included in **Exhibit JG-5** (for achievable savings, see Table SMW-D-1, **Exhibit JG-5** at Page 28 of 250; for PSCo Proposed Savings, see Table SMW-D-4, **Exhibit JG-5** at Page 46 of 250**)**. Data on ordered savings from Colo. Pub. Utils. Comm'n Decision No. C18-041, pp. 21-22, attached as **Exhibit JG-6**. 2019 and 2020 reported savings from Proceeding No. 18A-0606EG, 2019 Public Service Company of Colorado Demand-Side Management Annual Status Report, excerpted in **Exhibit JG-7**, and 2020 Public Service Company of Colorado Demand-Side Management Annual Status Report, excerpted in **Exhibit JG-8**. Note that 2020 savings were below forecast due to COVID-19 but were still significantly more than the potential study achievable potential. PSCo's approved plan for 2021 and 2022 calls for 538 GWh savings in 2021 and 523 GWh in 2022. Colo. Pub. Utils. Comm'n, Proceeding No. 20A-0287EG, Decision No. R21-0081 at 9-10, attached as **Exhibit JG-9**.

> in this endeavor. Thus, while the parties may continue to pursue the outstanding potential study, we will look to its forthcoming results as only an informative guidepost in future discussions.[25]

I note that the EmPOWER utilities have consistently reported savings at the required levels.[26]

Q: IF A UTILITY ACHIEVES SAVINGS THAT ARE EQUAL TO OR EVEN LESS THAN THE POTENTIAL STUDY ESTIMATE, DOES THAT AFFIRM THAT THE STUDY ACCURATELY PREDICTED THE ACHIEVABLE SAVINGS?

A: Not at all. Put simply, when the bar is low, it is not challenging to clear it. Doing so does not indicate that a utility could not also clear a higher bar. In fact, for all of the Companies' rhetoric regarding "actual" savings, there is a complete dearth of empirical evidence that supports the notion that potential studies in general, or this one in particular, are accurate predictors of achievable savings. This is in stark contrast to the evidence I have presented above which clearly shows that for PSCo the potential study underestimated savings it continues to achieve. The same was true for a 2013 Idaho potential study, which showed 0.6% maximum achievable potential despite subsequent reported savings of 1.13%, and Washington which

[25] Md. Pub. Serv. Comm'n, Order No. 87082 in Case Nos. 9153, 9154, 9155, 9156, 9157, 9362, at 21, https://www.psc.state.md.us/wp-content/uploads/Order-No.-87082-Case-Nos.-9153-9157-9362-EmPOWER-MD-Energy-Efficiency-Goal-Allocating-and-Cost-Effectiveness.pdf.

[26] See the semi-annual reports of the EmPOWER Maryland utilities in Case No. 9494, Md. Pub. Serv. Comm'n, Maillog Nos. 233825, 233771, 233770, 233740, 233736, available at https://www.psc.state.md.us/search-results/?q=9494&x.x=0&x.y=0&search=all&search=case.

achieved 1.54% savings compared with a 1.2% maximum achievable potential in its 2013 study.[27] And these portfolios all might have been able to achieve even higher levels of cost-effective savings had regulators required them to do so.

Q: HAS THE ISSUE OF THE RELIABILITY OF POTENTIAL STUDIES BEEN CONSIDERED BY INDUSTRY EXPERTS?

A: Yes. The issue of how well potential study estimates correlate with future results has been studied, notably by the American Council for an Energy Efficient Economy ("ACEEE"), the Regulatory Assistance Project ("RAP"), Lawrence-Berkeley National Laboratory ("LBNL"), and others.[28]

Q: WHAT DOES ACEEE HAVE TO SAY ABOUT POTENTIAL STUDIES?

A: ACEEE reviewed "45 publicly available studies published since 2009" with the intent to "better understand the nuts and bolts of these studies and how their various methodological approaches and assumptions influence energy efficiency potential estimates."[29] The report concludes, among other things, that

> [G]iven the inaccuracy of models and the generally conservative approach of these studies, there is likely a great

[27] Potential study values from Navigant 2016 Demand-side Management Potential Study, p. 98. Savings achievements from ACEEE, *2017 State Energy Efficiency Scorecard* at.29, https://www.aceee.org/research-report/u1710.

[28] *See, e.g.*, David Goldstein, *Extreme Efficiency: How Far Can We Go If We Really Need to?*, ACEEE Summer Study on Energy Efficiency in Buildings, Vol. 10, pp. 44-56, https://www.aceee.org/files/proceedings/2008/data/papers/10_435.pdf; Phil Mosenthal, *Do Potential Studies Accurately Forecast What is Possible in the Future? Are We Mislabeling and Misusing Them?*, presented at the ACEEE Efficiency As a Resource conference in Little Rock, AR (Sept. 21, 2015), https://www.aceee.org/sites/default/files/pdf/conferences/eer/2015/Philip_Mosenthal_Session2D_EER15_9.21.15.pdf; Chris Kramer and Glenn Reed, *Ten Pitfalls of Potential Studies*, published by the Regulatory Assistance Project (2012), https://www.raponline.org/wp-content/uploads/2016/05/energyfutures-kramerreed-tenpitfallsesdraft2-2012-oct-24.pdf.

[29] Max Neubauer, *Cracking the TEAPOT: Technical, Economic, and Achievable Energy Efficiency Potential Studies*, Report U1407, American Council for an Energy Efficient Economy, 2014, p. iv., https://www.aceee.org/research-report/u1407.

> deal of additional cost-effective potential available beyond what is identified…. Moreover, given the fact that most studies base their customer-participation models on economics, even short-term forecasts of market dynamics are murky. This is because studies tend to downplay the impact of program design elements such as marketing and education, as well as the non-energy justifications for investing in energy efficiency.[30]

Q: DOES THIS SUGGEST THAT POTENTIAL STUDIES DO NOT HAVE VALUE AS A TOOL IN DEVELOPMENT OF RESOURCE PLANS?

A: Not at all. Potential studies are important tools for identifying the primary technologies to target for near-term energy efficiency programs and can effectively help program administrators design and plan programs around known opportunities. However, it must be recognized that they are inherently conservative, and thus should not be taken to represent the ceiling for achievable potentials.

Q: DID THE COMPANIES' MPS INCLUDE ANALYSES OF HOW ENHANCED PROGRAM DESIGN ELEMENTS COULD AFFECT PARTICIPATION AND SAVINGS?

A: No, the Companies' "enhanced scenario" only reflected increased incentives, because "program design and optimization is outside the scope of this MPS."[31] Failing to consider program design enhancements is only one way that the MPS did not truly consider potential.

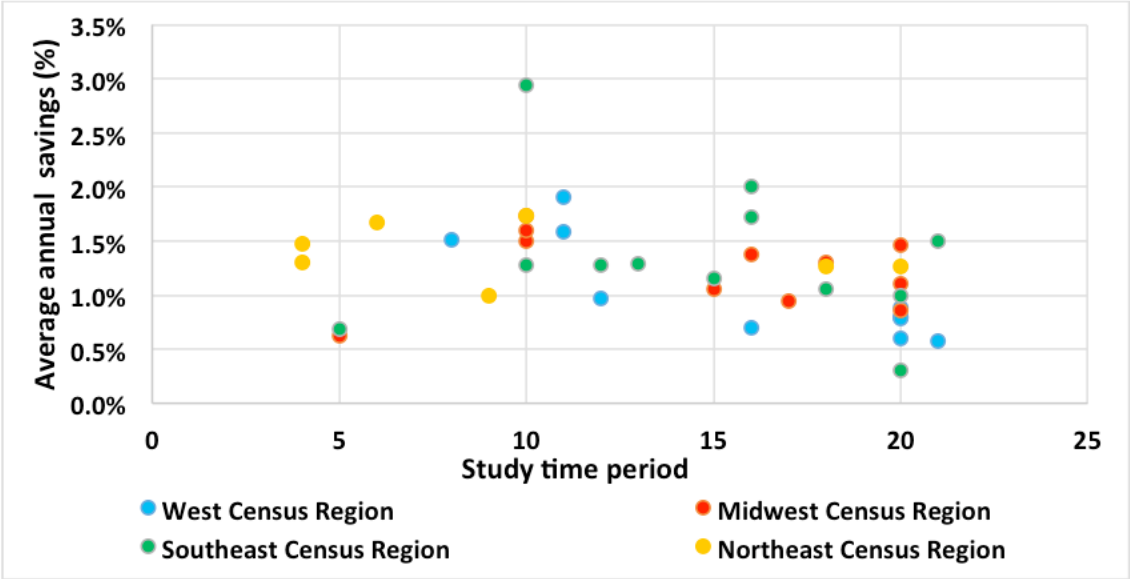
[30] *Id*. at 39.
[31] Nexant South Carolina Market Potential Study, p. 74.

Q: WITNESS BAK DISMISSES THE ACEEE "META-ANALYSIS" REFERENCED IN YOUR DIRECT TESTIMONY FOR A VARIETY OF REASONS. DO YOU AGREE WITH HIS ASSESSMENT?

A: No. Witness Bak states that "such high-level comparisons that span jurisdictions with no accounting for differences that influence the applicability, cost-effectiveness and adoption rate of EE measures are really not useful or reliable as a point of comparison for total energy savings potential."[32] However, this position is not supported by the ACEEE analysis of 45 potential studies cited above. ACEEE found, by analyzing "the relationship between savings and study time period, savings and census region (to assess possible geographical differences), savings and participation rates, and savings and avoided costs…[that] it does not appear that savings vary by geography: there was equal representation across the country for a given level of savings."[33] This is illustrated in Figure 1 below:

[32] Bak Rebuttal at 13.
[33] Neubauer, *supra* note 31, at v.

Figure 1: Average annual electricity savings (%), by census region[34]



Q: SHOULD THE COMMISSION ACCEPT THE COMPANIES' CLAIMS THAT THE POTENTIAL STUDY SHOWS "ACTUAL" ACHIEVABLE SAVINGS?

A: No. Creating and documenting assumptions in a model does not make the savings "actual" and the Commission should not accept that the Companies' version of achievable is correct. Rather, the Commission should look at the highest levels of savings being achieved by leading utilities and require the Companies to provide data either showing how they will achieve similar levels of savings, or why they purport that they cannot.

Q: WITNESS BAK DISMISSES THE EXAMPLES OF EMERGING TECHNOLOGIES THAT YOU PROVIDED. DID HE ACCURATELY REPRESENT THE INFORMATION THAT YOU PROVIDED IN DISCOVERY?

[34] *Id.* at 30 (Figure 4: Average annual electricity savings (%) by census region).

A: Certainly not. Witness Bak mentions two examples of emerging technologies that he felt would not be applicable in the Carolinas; however, he failed to mention the thousands of technology reports that are contained in the data links I provided in response to his discovery request. I suggest the Commission consider the example of the Minnesota Commerce Department, which conducted an "investigation of emerging technologies being developed and studied by publicly funded research in California through the Electric Purpose investment Charge (EPIC) program" with an eye to a "screening process to identify EPIC studies with the greatest potential relevance to Minnesota."[35] Rather than simply dismiss emerging technologies, it is the Companies' responsibility to thoroughly review such potentials and incorporate them in their estimates.

Q: THE COMPANIES' REBUTTAL TESTIMONY ALSO CLAIMS THAT ALL BUT ONE OF THE MEASURES YOU IDENTIFIED AS ABSENT IN THE MPS WERE ACTUALLY INCLUDED. DO YOU AGREE?

A: With the Companies' clarification regarding some of the measure naming conventions, I agree that several of the measures I identified do seem to have been included in the MPS. However, I disagree with the Companies' characterization of the following important measures:

- Variable Refrigerant Flow ("VRF") is not simply a Ductless Mini-Split AC. While VRF systems are based on heat pump technology, they are much more effective

[35] Evergreen Economics for Minnesota Dept. of Commerce, Division of Energy Resources, *Emerging Energy Efficiency Technologies, Leveraging Public Research for Application in Minnesota* at 3 (2019). https://mn.gov/commerce-stat/pdfs/card-leveraging-public-research.pdf

at distributing heating/cooling and balancing loads. Furthermore, VRF systems are capable of simultaneous heating and cooling;

- A variable speed compressor is not the same thing as a high efficiency air compressor, which the Companies describe as a "comparable measure";
- Process improvement is a completely different concept than a Facility Energy Management System;
- Strategic energy management ("SEM") is far more than a Facility Energy Management System. It is more accurately described as "systematic approach to energy management and involves the development of systems to achieve continuous improvement in energy efficiency. It requires workforce education and training and organizational culture change. SEM incorporates the plan-do-check-act (PDCA) approach that has been successfully applied to manufacturing quality improvement for many years through programs such as Total Quality Management (TQM), Six Sigma, Lean Manufacturing, and ISO 9001."[36]

Q: ARE THESE MEASURES SIGNIFICANT?

A: Given the Companies' position that the MPS includes all potential savings, any omissions are significant. The savings from these measures could be significant and should have been included in the MPS analysis.

Q: DID ANY OF THE INFORMATION PROVIDED IN THE COMPANIES' REBUTTAL TESTIMONY CHANGE THE RECOMMENDATIONS YOU MADE IN YOUR DIRECT TESTIMONY?

[36] Dan York et. al., *New Horizons for Energy Efficiency: Major Opportunities to Reach Higher Electricity Savings by 2030*, American Council for an Energy Efficient Economy, at 163 (2015), https://www.aceee.org/research-report/u1507.

A: I stand behind the recommendations made in my direct testimony, however I recognize that the time required to adhere to those recommendations would likely preclude them being made in time to be incorporated into a revised IRP. In future IRPs the Commission should expect the Companies to present scenarios for capturing all cost-effective energy efficiency, as by definition this is in the best interest of ratepayers, and this should be determined using the UCT rather than the TRC to determine cost-effectiveness, and by accounting for emerging technologies, measures not currently included in its program portfolio, and modifications and improvements Duke could make to its current marketing efforts and program designs that could increase program participation. In other words the amount of EE and DSM that is reflected in the next IRP should reflect true potential, and not a floor-level assessment.

However, because Duke Energy failed to present a meaningful estimate of potential and to do so now might delay a modified IRP beyond the Commission's desired timeframe, I suggest the Commission require the Companies to undertake modifications similar to what it required of Dominion Energy South Carolina in its IRP proceeding.[37] I recommend the Commission direct Duke Energy to conduct a "rapid assessment" and to include in its modified IRP a scenario that reaches 1.0% EE savings in the near term. This could be accomplished through any number of modifications to the potentials that were developed in the MPS, such as including savings for the remaining omitted measures, assessing the increased savings that

[37] S.C. Pub. Serv. Comm'n, Docket No. 2019-226-E, *South Carolina Energy Freedom Act (House Bill 3659) Proceeding Related to S.C. Code Ann. Section 58-37-40 and Integrated Resource Plans for Dominion Energy South Carolina, Incorporated*, Order No. 2020-832 at 75-76.

are available from enhanced program design and marketing, and accounting for the increased economic potential that would have been determined based on use of the UCT instead of the TRC. I further recommend the Commission require the Companies to increase programming for low income and historically disadvantaged communities at least in proportion to the overall increase in savings.

Q: WHAT ACTIONS DO YOU RECOMMEND FOR THE COMMISSION WITH RESPECT TO DUKE ENERGY'S NEXT IRP?

A: I recommend the Commission direct the Companies to modify their approach to estimating potential through all of the mechanisms I identified, such that a true estimate of potential as described above and in my direct testimony is used in the next IRP. I recommend the Commission require the Companies to develop a 1.0% savings scenario, and similarly direct it to assess increasing EE savings to specified higher levels, including 1.25%, 1.5%, 1.75%, and 2.0%.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA

DOCKET NOS. 2019-224-E AND 2019-225-E

South Carolina Energy Freedom Act (House Bill 3659) Proceeding Related to S.C. Code Ann. Section 58-37-40 and Integrated Resource Plans for Duke Energy Carolinas, LLC South Carolina Energy Freedom Act (House Bill 3659) Proceeding Related to S.C. Code Ann. Section 58-37-40 and Integrated Resource Plans for Duke Energy Progress, LLC	**CERTIFICATE OF SERVICE**

I certify that the following persons have been served with one (1) copy of the Surrebuttal Testimony and Exhibits of Jim Grevatt, filed on behalf of the South Carolina Coastal Conservation League, Southern Alliance for Clean Energy, Upstate Forever, Sierra Club, and Natural Resources Defense Council, via electronic mail at the addresses set forth below:

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This 15th day of April 2021.

s/Kate Lee Mixson